

4/PRTS - 1 -

10/031969

531 Rec'd PCT

24 JAN 2002

5 CONTAINER HANDLING APPARATUS OR CRADLE

Technical Field

10 This invention relates to a container handling apparatus or cradle, and more particularly an apparatus or cradle adapted to be interconnected to a shipping container whereby the container can be shifted onto and off the trailer (tray) of a truck at a shipping port, rail terminal and/or factory.

Background Art

15 Manipulation of containers is typically done by using fork lift trucks, side-lifters, mobile cranes or accessories such as portable lifting devices in the form of jigs and jacks which can be located on-site or carried with a container.

20

Fork lift trucks are very expensive equipment and are usually only available at well equipped sites, and are not necessarily available at many sites where containers need to be loaded onto and off the trays or trailers of road transports/trucks. Side-lifters are also only available at well equipped sites and due to their manner of operation require space equivalent to three times the width of the container. Mobile cranes on the other hand are also very costly installations and normally only available at sites dedicated to the handling of large numbers of containers, such as at a shipping port.

35 As an alternative to fork lift trucks, side-lifters and mobile cranes, portable lifting devices have been proposed, and such a lifting device is disclosed in International patent publication WO92/19527. However, the weight of a fully loaded container with such lifting

- 2 -

devices leads to instability when supported on a number of separate jacks at each corner of the container, and thus such devices are not a totally satisfactory solution to the problem of lifting and manoeuvring containers, whilst in addition, the lifting devices also require the services of a fork lift truck to position the devices for attachment to a container.

Other lifting devices that are known utilise a rigid chassis having a plurality of lifting jacks, and examples of these are disclosed in US patent publications nos. 3460697, 4053073, 3520433, 4522550 and 3152709. However, none of the disclosures in these publications provide a container handling system adapted to move a container, in particular the movement of a container once it has been elevated for loading onto transport. The ability to move containers small distances is a particularly important problem which has not been addressed by any of the prior art devices or systems presently available to handle containers. Furthermore, none of the known devices and systems are able to be attached to the top of the container such that a single container handling system or cradle can be used on multiple containers. An overhead crane can be used to fit such devices and systems to a container thereby avoiding the need for fork lifts or other types of mobile cranes.

Therefore, problems associated with loading and unloading containers onto and off the trays or trucks is only satisfactorily accomplished at very well equipped sites by the use of sophisticated and highly costly dedicated equipment. Moreover, the ability to manipulate, that is manoeuvre, containers small distances is only available with the use of the same equipment used for loading and unloading the containers.

Disclosure of the Invention

In accordance with the present invention there is envisaged a container handling apparatus or cradle, including a main frame adapted to be moved laterally from one side of a container and over said container, means to raise and lower said main frame and thereby to raise and lower a container suspended therefrom, means to engage the top and/or bottom of said container to attach said container to said frame. Preferably means are provided to allow said apparatus or cradle to be moved around.

Preferably the means to allow said apparatus or cradle to move around are wheels forming part of said apparatus or cradle.

Alternatively a fork lift truck or the like may be used to move said apparatus or cradle around, and said apparatus or cradle further includes means for engagement by the tines of said fork lift truck.

Brief Description of the Drawings

One preferred embodiment of the invention will now be described with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of the apparatus or cradle of this preferred embodiment of the invention and carrying a shipping container;

Figure 2 is a side elevational view of the apparatus or cradle of Figure 1;

Figure 3 is an end elevational view of the apparatus or cradle of Figures 1 and 2 carrying a shipping container out of alignment with the tray of a truck; and

Figure 4 is an end elevational view similar to that of Figure 3 having been adjusted to align the shipping container with the tray of the truck.

5 Best Mode for Carrying Out the Invention

 In this preferred embodiment of the invention the apparatus, hereinafter referred to as a container cradle 10, is adapted to be clipped onto a shipping container C. The cradle 10 has a main frame, generally indicated as 11, and includes trapezoidal shaped end frames 12, having upwardly angled frame members 12a, vertical frame members 12b, and upper and lower horizontal frame members 12c and 12d respectively.

15 The lower horizontal frame members 12d are channel sections, and received therethrough are snugly fitting ram support beams 30 on which the main frame 11 as a whole can be moved laterally within the cradle in a manner to be later described. The main frame is completed by longitudinally extending beams 13 attached to the end frames via stub tubes 18 which can come in various sizes and which can be interchanged to accommodate different lengths of containers. The beams 13 consist of two parallel longitudinally extending top beams 13a and a single longitudinally extending bottom beams 13b at one side of the main frame, with the bottom of the other side of the main frame being open to allow the main frame to be laterally moved over the container C. Location pins 14 and locking devices 14a at the top and bottom of the main frame engaged with apertures within the container, whilst on the opposite side of the main frame locking device pillars 15 extend downwardly from beneath the end frames 12, and to which they are connected by connecting brackets 16. The pillars 15 receive further locking devices 17 which are movable longitudinally of the main frame to engage in apertures at the bottom end of the container at the open side of the main frames.

- 5 -

The ram support beams 30 carry telescopic rams 19 at either end, and at each of the four corners of the cradle. The cylinders 19a of the rams 19 extend upwardly from the ends of the beams 12 whilst the ram pistons 19b extend downwardly from the ends of the beams, and in this embodiment they carry at their lower ends yokes 20 carrying ground engaging wheels 21. The telescopic rams may be received within hollow square cross-sectional box sections surrounding the rams, and also telescopically slidable within each other as the rams are extended and retracted. These box sections, although not shown, will serve to provide additional rigidity and strength for the container cradle when carrying the weight of a shipping container and supported solely on the rams and their surrounding telescopic box sections. In addition, the yokes 20 may be pivotable about the vertical axes of the pistons for the purposes of allowing the cradle to be steered whilst being rolled around a site either with or without a container supported within the cradle. The cradle may be manually rolled around and steered on the wheels 21, or alternatively the cradle may be towed by a fork lift truck or the like, or even in another alternative embodiment the wheels can be motorised to be self-propelled and an operator controlled steering mechanism may also be provided whereby to steer the movement of the apparatus or cradle during its manoeuvres whereby to be self-steered.

A pair of parallel extending elongate tubular forklift tine receiving members 22 are provided midway along the lengths of the longitudinally extending top beams 13 of the main frame, and extending between the top beams, and which also receive the tines T of a fork lift truck F as shown in Figure 1. The positions of the tine receiving members 22 relatively to each other may be adjustable to accommodate different tine spacings when required depending on the forklift truck to be utilised to manoeuvre the cradle with or without a container supported therein. The

tine receiving members 22 also help to balance the cradle during manoeuvres with or without a container suspended therein as well as providing a large surface area for engagement by the tines.

5

The cradle either loaded or unloaded can be manoeuvred around a site on its wheels as described above, or by the fork lift truck F, if available on site, or a combination of both, or in an alternative embodiment when
10 the rams do not have ground engaging wheels, but merely ground engaging base plates, manoeuvring would be accomplished only with the use of any available fork lift truck. The wheels or base plates may be attached to the lower ends of the rams by axially adjustable screw fittings
15 to allow the height of the cradle at each of its corners to be adjusted as necessary with varying ground surface conditions.

With reference to Figure 2 of the drawings, when
20 unloading a container C from the tray of a truck TT, the cradle, with rams extended, may be rolled over the top of the container on the truck tray or alternatively positioned over the top of the container by the fork lift truck F. The rams of the fork lift truck then lower the cradle onto
25 the top of the container and the location pins 14a and locking devices 14b and 17 engaged with the container. Twist locks (not shown) are engaged with locking lugs TTa carried by the tray of the truck, whereafter the rams are again extended to lift the container from the tray of the
30 truck. The cradle with the container supported therein is rolled laterally relative to the truck tray, or the truck can be driven away from beneath the container, which will be necessary in the case where the cradle is not mounted on wheels but merely mounted on ground engaging base plates.
35 Once lifted up from, and then away from, the truck tray the container can then be lowered to the ground by retracting the rams 19.

- 7 -

In order to load the container C onto the tray of the truck TT, the sequence of events described above for unloading the container are reversed, with an additional event in the sequence of events being performed if
5 necessary when the container is not correctly aligned with the truck tray, and which will now be described particularly with reference to Figures 3 and 4 of the drawings. In order to deal with such misalignment, horizontally orientated hydraulic rams 31 are coupled
10 between the rams supporting beams 30 and the vertical frame members 12b of the end frames 12, and can be extended and retracted to shift the position of the main frame along the length of the ram support beams. With reference to Figures 3 and 4 of the drawings, in Figure 3 it will be apparent
15 that the container C is not laterally aligned with the tray of the truck and in those circumstances, the horizontally orientated rams 31 are extended to laterally shift the position of the main frame and therefore the container within the cradle as a whole to the position shown in
20 Figure 4 where the container is aligned with the tray of the truck and can therefore be lowered correctly onto the tray of the truck. As an alternative in a situation where the wheels 21 are steerable, and also possibly motorised, and as referred to previously, the wheels may be turned
25 (steered) 90° to the length of the container and the cradle rolled or driven to align the container with the tray of the truck.

The cradle, when required to be moved from one
30 site to another for use at different sites for use with the same or different containers, may be modular in construction whereby sections of the cradle can be disassembled and carried on top of the container as it is trucked from one site to another, or the modular sections
35 can be transported separately on a different truck. Alternatively, connections between the various components of the cradle, including those of the main frame 11 and the

connections between the hydraulic raising and lowering rams 19 and the rams support beams 12, may, with appropriate locking devices, be hinged connections whereby the cradle may be collapsible to a substantially flat condition for
5 transportation, rather than being disassembled.

The hydraulics for the cradle may be provided by an onboard power-pack P, or alternatively an external power-pack delivered to, or already existing at, the site. It is envisaged that with most loaded containers a standard
10 fork lift truck with a 3 tonne, or above, capacity will be sufficient if a fork lift truck is required.

The cradle of this preferred embodiment of the invention when not used for handling and manoeuvring
15 containers, can also be used for other purposes, such as a movable work platform, whilst, as it can be raised up to 1800mm above ground level, it can also be used for servicing and repair of equipment and machinery, for example, repairs to the undersides of containers.